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Agricultural Experiment Station

College of Agriculture, West Virginia University

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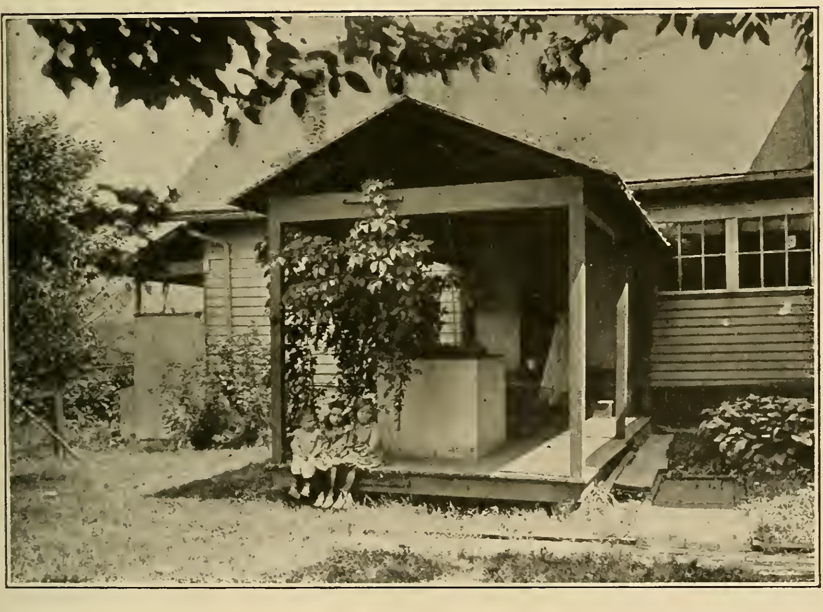
Farm Water Supply and Sewage Disposal in West Virginia



By

F. D. CORNELL, Jr.

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Farm Water Supply and Sewage Disposal in West Virginia

The need for sanitary measures, even sanitary science itself, has its rise in the prevalence and occurrence of bacteria in nature. Sanitary science, therefore, devotes its entire attention to the recognition of these organisms and the study of ways of controlling or inhibiting their growth.

Bacteria may be thought of as tiny plants, carrying on all the vital functions that are found in the larger organisms. When it is remembered that it takes from 15,000 to 20,000 of these minute cells end to end to form a line an inch long, the fact that they are not seen in everyday life is easily understood. They force themselves to our attention in their vital relationships as the cause of typhoid, diptheria, tuberculosis, dysentery, and many other diseases, and as the cause of such processes as the spoiling of food, souring of milk, decay, and putrefaction.

Through studying these organisms and learning their nature and requirements for growth, knowledge as to how they may be partially controlled has been obtained. As a result have come about the processes of pasteurization, sterilization, and refrigeration; the discovery of innoculation for disease; disinfectants; germicides; and many other controlling measures.

Bacteria are found in great numbers in the upper six inches of the soil. Farther down, however, their numbers gradually decrease until at a depth of about ten feet the soil is practically sterile. In rural districts where each farmer has his own water supply, he must be his own health officer. Wells and springs so poorly protected that seepage from the upper layers of soil, and surface run-off, can get into them are in serious danger of pollution. Sources of supply located near polluted streams, or below pastures, barns, or privies, are also in danger of contamination. The waste discharges from animals and human beings contain harmful bacteria, especially where there is any disease, and these being carried by the water are often productive of dire results. "Typhoid fever, cholera, summer complaint of infants, and similar bowel diseases are due to swallowing human filth, and from nothing else.*

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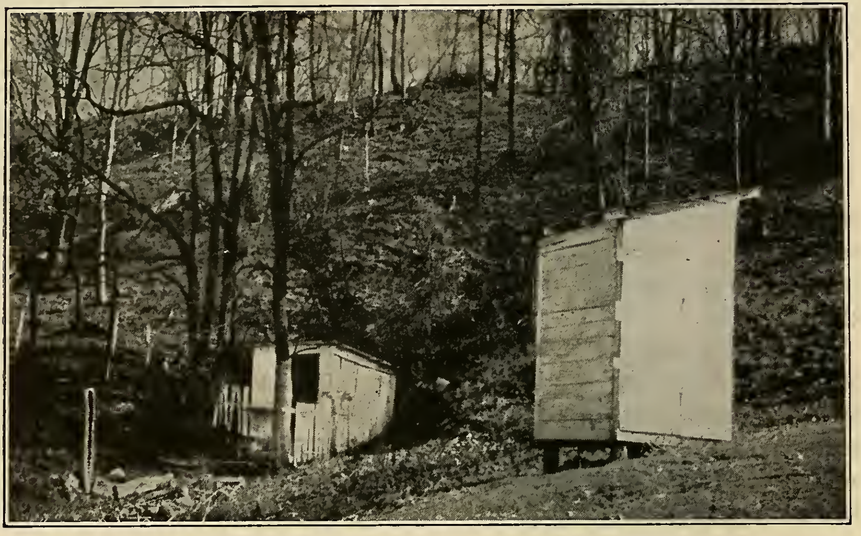
*Instructions for Building Sanitary Privies for Rural Homes. State Dept. of Health, Charleston, W. Va. (1923).



A Spring so Located that Drainage from the Privy and Pasture Above is a Source of Great Danger.

Importance of the Problem

"The farmer can do no other one thing so vital to his own and the public health as to make sure of the continued purity of the farm water supply."† The serious nature of the problem is indicated by investigations which show that about three out of every four shallow wells on farms are badly polluted.

Directly related to this problem is the safe disposal of sewage on the farm. Many of the practices now common are very unsanitary and dangerous. On many farms no privies are to be found and excretions are deposited carelessly anywhere. Many farmers allow the chickens to clean the closets, leaving them open and the filth exposed. It is common for the closet to be built on the brink of a hill and left open underneath so that surface run-off will wash the waste down the hill. Some closets are built over streams, to save cleaning. Others allow the buildings to become so dilapidated and filthy that rather than use them, excretions are deposited elsewhere. Sewage is drained into cesspools, abandoned wells, streams, or allowed to run out on the surface of the fields. All such practices are very unsafe.

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†Farmers' Bulletin 1227, U. S. Dept. of Agr. (1922).

Great strides have been made in learning how to control insect pests, plant and animal diseases, how to produce better crops, how to breed to obtain desired characteristics in plants and animals, and many other things of great benefit to the farmer; but little emphasis has been laid upon the bringing about of sanitary improvements which directly affect his health and that of his family. In crowded cities where sanitary measures are imperative, marked advancement has been made, while in the rural districts the progress has been entirely too slow.

The Cost of Disease

The importance and economy of adequate sanitary precaution may be clearly demonstrated by a consideration of the cost of disease. A typical case of typhoid fever, a preventable disease, very aptly illustrates the extravagance of carelessness.

The average duration of a case of typhoid fever is six weeks. Assuming that the patient is taken to a hospital, the costs would be somewhat as follows:

Cost of hospital services—$5 per day, for 6 weeks	$210
One visit per day by physician, $3	126
Special nurse, one week—day and night	70
Loss of work, six weeks at ordinary wages, $4 per day	144
Total Cost	$550

If the patient stayed at home in the rural districts the cost would be approximately as follows:

Doctor, one call per day, plus mileage, $5	$210
Extra help necessary	60
Special nurse, one week during crisis	35
Loss of work, six weeks at average farm laborer's wages $2.50	90
	$395

Thus, it can be seen that it costs from $300 to $500 merely to get back to the starting point, once typhoid has gained a foothold.

According to the Biennial Report of the State Department of Health, (1922-1923-1924), there were 1381 cases of typhoid fever reported from July 1, 1923, to Jan. 30, 1924. These, figured at $300 per case, represent an outlay by the people of the state of $414,300. This assumes that all cases recovered. As a matter of fact there were 238 deaths during this period. In addition to the costs given, there are other costs, especially the loss of life, which cannot be estimated in dollars and cents.

The following statements taken from the report mentioned on the preceding page make it clear that these considerations should be of vital interest to the rural people of the state:

"Except for some unusual condition, health authorities recognize typhoid fever as a disease incident to rural communities. It is filth borne, communicable, and largely preventable. The open type insanitary privy is the chief source of infection in the rural sections and there are hundreds of square miles in the state without a sanitary device."

Typhoid Fever Often Results from Carelessly Locating the Privy too Near the Source of Water Supply.

"Our mortality rate from typhoid fever is unnecessarily high—so high as to constitute a reproach to the sanitation and civilization of our people."

From this discussion it may well be concluded that any amounts invested by the farmer in bringing about sanitary conditions, yield large returns.

PURPOSE OF THE STUDY

In order to determine the importance of the farm sanitation problem in West Virginia, a survey of sanitary conditions were made in three counties of West Virginia. Records of exisitng conditions were taken on a representative group of farms in each section, thus revealing the progress that has been made and the points on which farmers need information and stimulation.

Representatives of the Department of Farm Economics Interviewing a Farmer.

Records were taken only on farms where practically the entire living was derived from the farm operation. In this way, the data present a true picture of farm conditions in the sections studied and give an insight into what conditions on farms throughout the state might be.

Attention was centered entirely upon farm water supply and sewage disposal since it was felt that these were the points of most vital importance at the present time.

The counties in which the study was made were chosen as typical of the sections of the state in which they were located. A summary of the data obtained in each county, therefore, should give a fairly accurate picture of sanitary conditions on farms in that section of West Virginia, while a compilation of all the information obtained from the several counties should be a fairly reliable cross-section of water supply and sewage disposal conditions on the farms of the state as a whole.

MARSHALL COUNTY

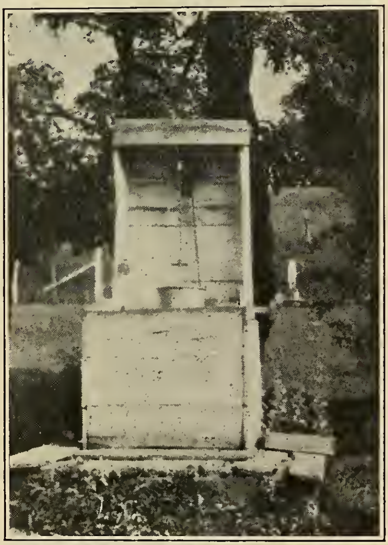
Marshall County is located in the northern panhandle of West Virginia. The region is rolling and hilly with relatively small areas of bottom land along the streams. Because of the topography, there are comparatively large areas of pasture land. The type of farming is general, with dairy cattle or sheep as an important farm enterprise.

A Cistern Used to Furnish a Supplementary Water Supply.

Marshall was one of nine counties in West Virginia at the time of the survey which had a full-time county health unit. Although in force but a short time, the unit was functioning admirably and its influence had been responsible for much improvement in sanitary conditions. With the attention being given by the health unit to water supply and sewage disposal, marked changes may be looked for in a few years.

Water Supply

In all, 112 farms were visited in this county and a record was obtained from each. A summary of the information obtained shows that only five of the 112 farmers had water piped into the house, and of these, only four had bath equipment. On all of the other farms the drinking water was carried from outside.



Thirty-nine Windlasses were Found on the 112 Marshall County Farms.

The distinction between drinking water supply and general water supply is drawn because on thirty-one farms that got the drinking water from wells or springs, there were also cisterns which furnished a supplementary supply for washing, etc. The water from none of these cisterns was used for drinking purposes. Eight of these thirty-one farmers had installed pumps to bring the water from the cistern to the kitchen; however, they still carried the drinking water from outside. With the exception of these eight, the five who had running water in the house, and one who had a pump in the kitchen from a spring in the cellar, all of the families carried their entire water supply from outside. The thirty-one cisterns used merely as a supplementary supply are not shown in Table I.

TABLE I.—Sources and Methods of Obtaining Water on 112 Marshall County Farms.

How Obtained	Source of Supply				Totals
	Dug Wells	Drilled Wells	Springs	Cisterns	
Complete Water System with Bath			3	1	4
Water System—No Bath			1		1
Pump in Kitchen			1		1
Pump on Well or Cistern Outside	33	9		6	48
Windlass on Well Outside	38			1	39
Rope and Bucket	5				5
Dipped Up			14		14
Totals	76	9	19	8	112

Table I shows the source of water supply on the 112 farms visited and the means of obtaining the water. It can be seen that dug wells were the most common source of supply in this region. The table also shows that the windlass was still the most common device for lifting water from dug wells. In Figure 1 the same data are presented graphically.

The carrying of water from outside was no small task. Water on these farms was carried distances ranging from 5 feet to 300 yards, the average distance being 50 feet; and in quantities sufficient to meet the needs of a family averaging five persons.

On fifteen of the 107 farms where water was carried, there was a supply so located that the water could easily have been supplied to the house direct, by gravity. Thirty farms could have piped water from a lower level to a reservoir on a hill near the house and thus have had a relatively inexpensive water system. Taking both groups together, water would have had to be piped an average distance of only 169 yards. Eleven families said that they were contemplating the installation of running water and bath equipment, but in nearly every case the time when it would be done was very indefinite. Five others were planning to pipe water to the kitchen at some future time.

In most cases the wells and springs were so located that danger of contamination from seepage was not imminent. There were ten wells, however, located below barns, and one below an outdoor closet, thus making the situation dangerous. Many wells and springs lacked adequate walls and covering, thereby increasing the possibility of filth getting in from the surface. One family carried water from a neighboring farm, due to the fact that something had fallen in the

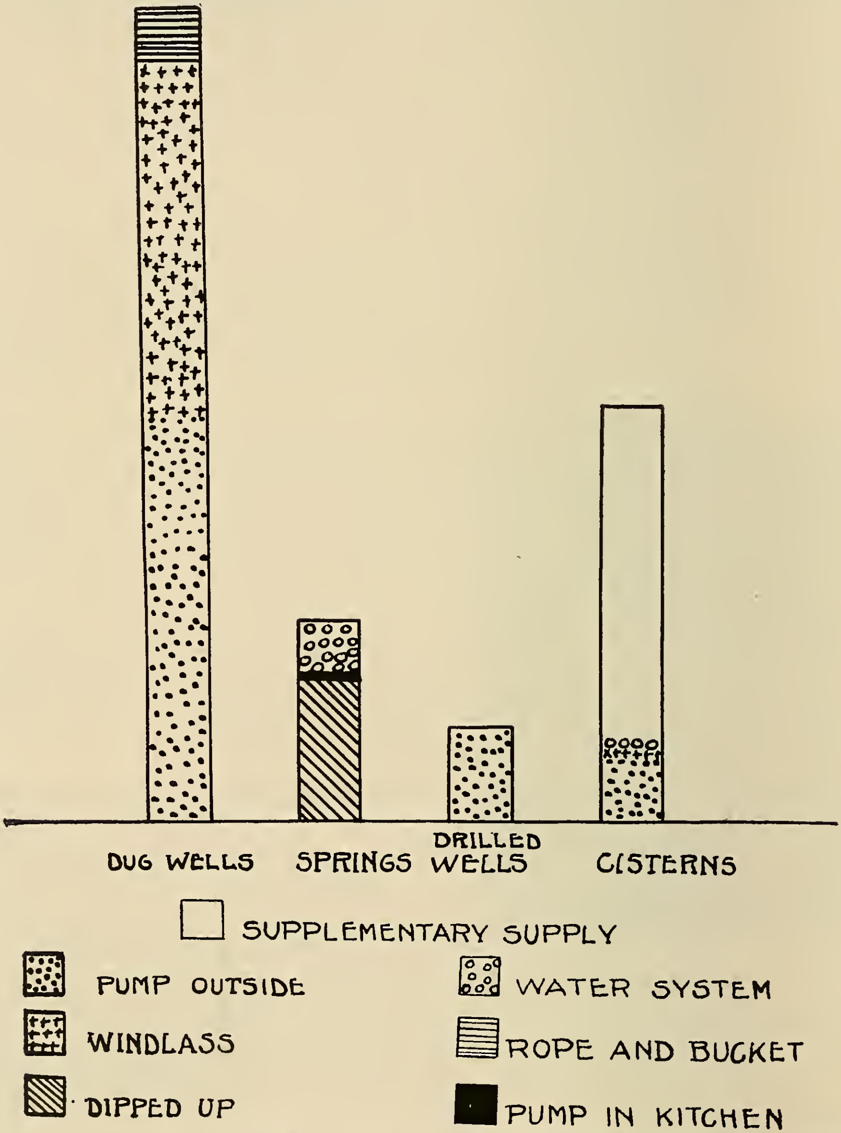


Fig. I.—Graphic Representation of Sources and Methods of Obtaining Water on 112 Marshall County Farms.

well and seriously polluted the water. The practice, more dangerous than economical, of allowing the excess water as it was pumped, to drain back into the wells was not uncommon.

Sewage Disposal

In the matter of sewage disposal certainly extensive improvements are needed. Only the four families with complete water systems had bath equipment. On three of these farms the sewage drained out on the surface in fields below the houses and on the other farm the effluent was discharged into a near-by creek. No septic tanks were used.

The other 108 families used either an outdoor closet or nothing. On six farms there were no closets at all and excretions were deposited anywhere and with utter disregard for even elementary sanitary principles. Only fifteen pit closets were found on the farms visited, the rest being built on the surface. Forty-nine of these latter were closed underneath so that nothing could get to the waste. Twenty-seven farmers, however, admitted leaving the closets open behind so that the chickens would help to keep them clean. One man had gone so far as to build the privy in the end of the chicken coop. Eleven others had built their closets on the brinks of hills and left them open underneath so that the waste would wash down the hills.

Figure 2 shows in a graphic way the methods of sewage disposal found.

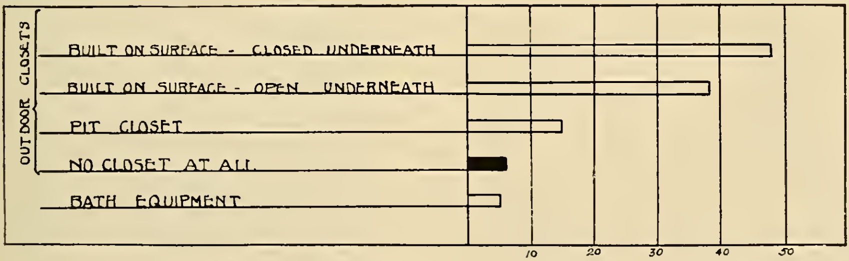


Fig. 2.—Methods of Sewage Disposal on 112 Marshall County Farms.

The closets were located at distances varying from 15 to 300 feet from the houses, or an average distance of 115 feet. Some were so far away as to make them extremely inconvenient. The general condition of the buildings was only fair; thirty of them were very poor.

Seventy of the families visited used lime in the closets; fourteen of these, however, only occasionally when the closets were cleaned. Four families used ashes, two used disinfectants, while twenty-six practiced no such sanitary measures.

In the matter of cleaning the closets there was considerable neglect. The general practice with those who never cleaned them was simply to move the building whenever it became absolutely necessary.

Figure 3 shows the distribution of families, represented by dots, according to the number of times the closets were cleaned per year, and the number of families in each group.

The average size of farm visited in Marshall County was 110.2 acres, and as has been stated, the families averaged five persons. Only those persons actually living on the farms at the time of the survey were enumerated, so the figure shows the true number of lives affected by the conditions herein set forth

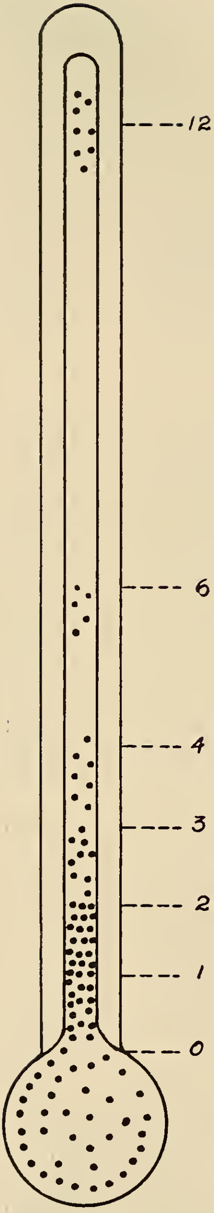


Fig. 3.—Number of Times Closets Were Cleaned per Year on 108 Marshall County Farms.

SUMMERS COUNTY

Summers County is located in the southeastern part of West Virginia, in one of the principal livestock producing sections of the state. Because of the topography, the abundance of bluegrass pasture, and market conditions, livestock production is an important farm enterprise.

The survey in this county was made just at the close of an extended drought of three months. As a result, there was a scarcity of water and conditions in some sections were probably worse than might ordinarily have been expected. This almost unprecedented emergency brought to many the realization that provision for an ample water supply, properly protected, is of vast importance.

A total of one hundred farms in different sections of the county was visited, and a summary of the information obtained indicates the need for improvement.

Water Supply

Only two of the hundred farms on which data were taken had running water in the house with bath equipment. Three others had running water at the kitchen sink, and two had a pump in the kitchen. The remaining ninety-three families carried the entire water supply from outside.

Drilling a Well. Drilled Wells Generally Furnish a Safer Source of Water Supply than Unprotected Dug Wells and Springs.

Drilled wells were found most frequently, dug wells in only a few instances, and cisterns not at all. Because of their frequent occurrence, springs were an important source of water supply in this region.

Table 2 shows the sources of supply and the methods used in obtaining the water.

A tubular bucket with a valve in the bottom and operated by a rope, pulled by hand over a pulley was commonly used in drilled wells. Where water was carried from springs it was simply dipped up.

When springs were used as a source of supply, their location was often most inconvenient. Water was carried distances ranging from 5 feet to 300 yards. The inconvenience of many locations is shown by the fact that water was carried an average distance of 114 feet.

Figure 4 illustrates the source of supply and methods used in

TABLE 2.—Source and Method of Obtaining Water on 100 Summers County Farms.

How Obtained	Source of Supply				Totals
	Dug Wells	Drilled Wells	Springs	Cisterns	
Complete Water System with Bath	1	1			2
Water System—No Bath			3		3
Pump in Kitchen		2			2
Pump on Well or Cistern Outside	2	19			21
Windlass on Well Outside	2				2
Rope and Bucket	2	32			34
Dipped Up			36		36
Totals	7	54	39		100

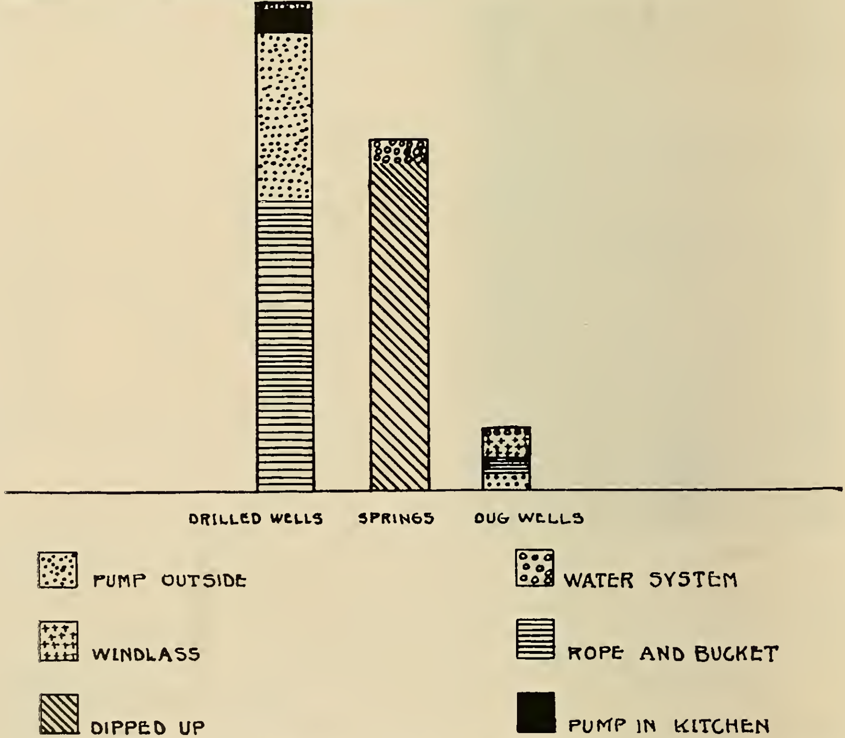


Fig. 4.—Graphic Representation of Sources and Methods of Obtaining Water on 100 Summers County Farms.

Of the ninety-five families who did not have running water in the houses, there were thirty-seven that could have installed such a convenience by piping the water direct from springs at a higher elevation. The average distance water would have had to be piped was only 230 yards. Of this number, however, only fifteen contemplated such a move, and none of these had any definite plans or knew when it could be done.

A Concrete Reservoir Under Construction to Store Water for a Gravity Water System.

Eleven families were found who used springs that were neither walled nor covered. Five others used open springs that were walled with boards. One spring was located in a pasture. Seven families admitted that surface water drained into their springs, and six families used a supply located below pastures or barns. One case of typhoid fever was found where an unprotected spring had been used as a source of water supply, and several other families said the water was especially bad during the dry weather. All of these conditions and results could have been prevented.

The case of typhoid fever illustrates very clearly what may be expected where a polluted water supply is used. And, where typhoid is found, it is seldom that a second case does not develop. Such considerations are, therefore, not only individual matters but resolve themselves into questions of public welfare as well.

A Spring Poorly Protected. A Dangerous Source of Water Supply.

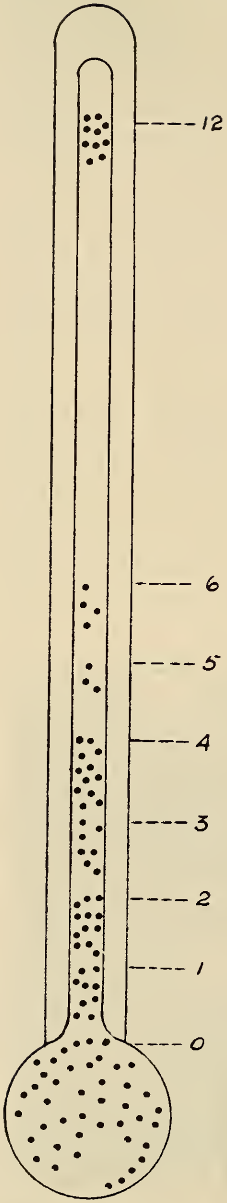


Fig. 5.—Number of Times Closets Were Cleaned per Year on 98 Summers County Farms.

Sewage Disposal

That much improvement could be brought about in the methods of sewage disposal on the Summers County farms is revealed by the fact that on fourteen farms no privies at all were found, and only two farmers had bath equipment. All others had an outdoor closet of some description. No pit closets were found, and no septic tanks were used. All the outdoor privies were built on the surface. Of the eighty-four outside closets, twenty-three were closed so that nothing could get to the waste. All of the rest were open underneath for convenience in cleaning. In many cases, closets were built on slopes so that the surface run-off would wash the waste down the hills. Chickens were also a great aid in the cleaning process.

Figure 6 shows the methods of sewage disposal found.

The privies were located distances ranging from 50 feet to 300 yards from the house, the average distance being 167 feet. The number of times they were cleaned per year varied greatly. A few families exercised much care in this regard. By far the greater percentage of the closets, however, were cleaned seldom, if at all.

Figure 5 shows the distribution of families, represented by dots, according to the number of times the closets were cleaned per year, and the number of families in each group. The fourteen families who had no closets were included in those listed as never cleaning the privies.

There were sixty-one of the hundred families who used lime in the closets at least occasionally, five who used ashes, and one who used dry earth. Those remaining, who had outdoor privies, took no such precaution.

The average size of farm visited in Summers County was 125 acres, and the average size of family actually living on the farms was 5.5 persons.

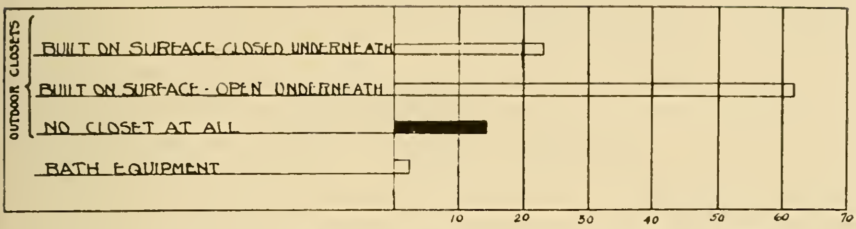


Fig. 6.—Methods of Sewage Disposal on 100 Summers County Farms.

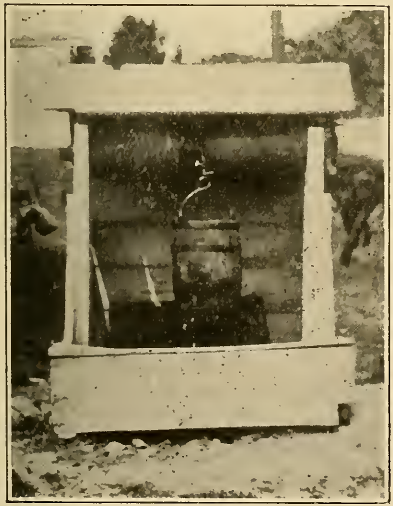
PLEASANTS COUNTY

Pleasants County is located in the northwestern part of West Virginia, and borders the Ohio River. The topography, in general, is rolling to hilly. There are limited areas of bottom land along the river. It is the third smallest county in the state, is strictly agricultural, and is typical of the farming territory of that region.

Seventy-five records of farm sanitary conditions were taken in various parts of this county, thus giving a fairly accurate cross-section of the prevailing situation.

The type of farming found in Pleasants County was general, with fruit growing and dairying as important farm enterprises.

Pleasants County differed from the other sections studied in that a large percentage of the farmers used cisterns as a source of water supply. Cisterns were found on twenty-six of the seventy-five farms visited, and of this number, thirteen cisterns were equipped with filters. Dug wells furnished the water on twenty-seven farms; eleven farmers used drilled wells; and on eleven farms springs were the source of supply.



A Common Type of Windlass Found on West Virginia Farms.

Only two of the seventy-five farmers visited had running water in the house with bath equipment. One family had running water and one family a pump at the kitchen sink. All others carried the entire water supply from outside.

TABLE 3.—Source and Method of Obtaining Water on 75 Pleasants County Farms.

How Obtained	Source of Supply				Totals
	Dug Wells	Drilled Wells	Springs	Cisterns	
Complete Water System with Bath			2		2
Water System—No Bath			1		1
Pump in Kitchen				1	1
Pump on Well or Cistern Outside	14	9		23	46
Windlass on Well Outside	6				6
Rope and Bucket	7	2		2	11
Dipped Up			8		8
Totals	27	11	11	26	75

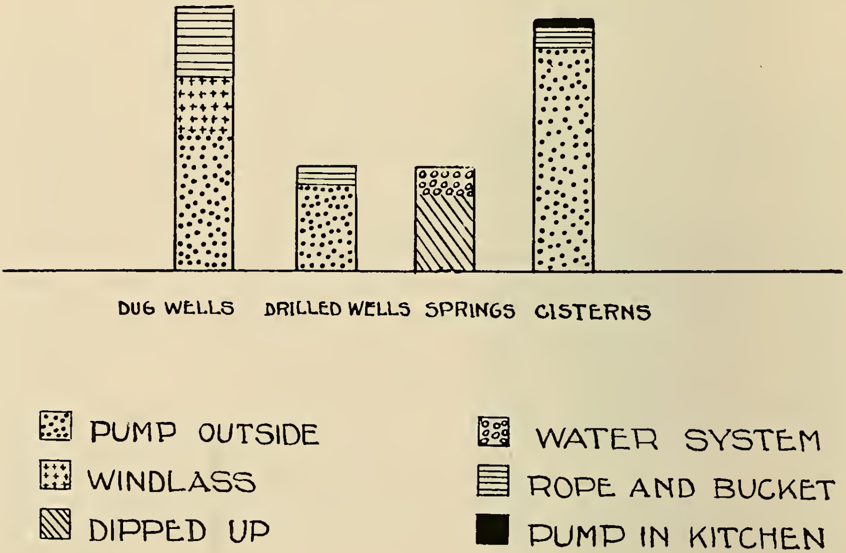


Fig. 7.—Graphic Representation of Sources and Methods of Obtaining Water on 75 Pleasants County Farms.

Table 3 shows the sources and methods of obtaining the water in Pleasants County. On seven of the farms water was carried distances greater than 200 yards. Eliminating these exceptional cases, water was carried an average distance of 22 feet. Water was carried the greater distances only when springs were used as sources of supply.

There were fourteen farms where water was not piped inside, that had a supply high enough to deliver it directly to the house by gravity. The water would have had to be piped an average distance of 176 yards.

Figure 7 shows graphically the sources of water supply found.

Of all farmers visited, however, there were only seven who contemplated any sort of running water installation. The rest seemed content to go on carrying water as had always been their custom.

With but few exceptions, the wells and springs were so located that the danger of contamination from seepage was not great; that is, the danger would have been slight had all sources been well protected. In view of the protection afforded, however, eight sources were extremely poor, and eight others only fair. Many water supplies could have been made much safer for use by properly protecting them against seepage, and contamination from the surface.

Sewage Disposal

In Pleasants County, twenty-nine of the closets found were of the pit type. This was a much higher percentage than was found in either of the other counties studied. The pits varied considerably in depth; they were never cleaned, and when full were covered with earth; new pits were dug, and the closets were moved to the new locations. There was only one farm on which no closet at all was found, and only two farmers had installed bath equipment. Thus

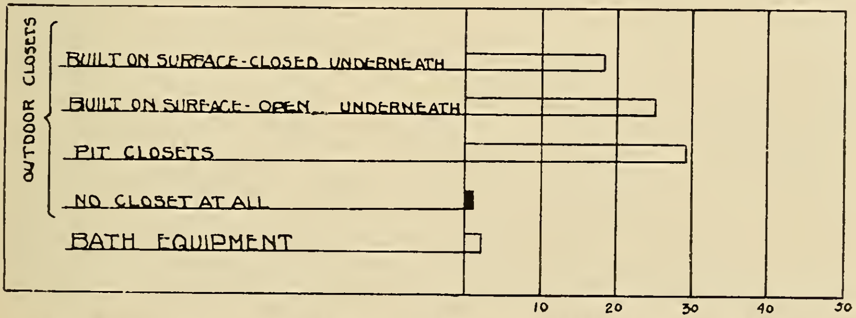


Fig. 8.—Methods of Sewage Disposal on 75 Pleasants County Farms.

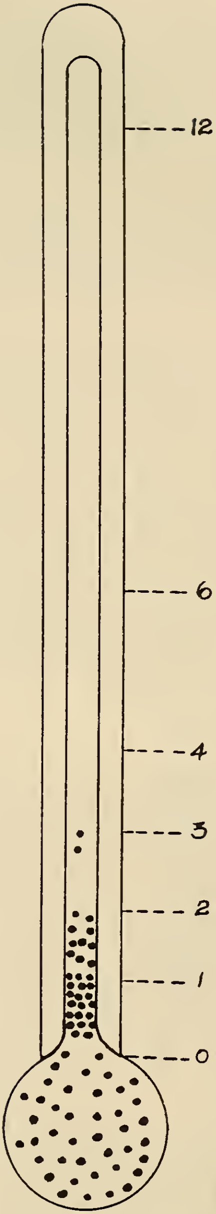


Fig. 9. — Number of Times Closets Were Cleaned per Year on 72 Pleasants County Farms.

there were forty-three farms on which the outdoor closets were built entirely on the surface. Twenty-five of these were open underneath allowing the waste to be exposed.

Figure 8 shows the types of sewage disposal found on the farms in Pleasants County.

The closets were located anywhere from 25 to 450 feet from the houses, the average distance being 105 feet. There were many that were most inconveniently placed, all of which would have been unnecessary had the privies been kept reasonably clean. In most cases, however, cleaning was seldom done.

Figure 9 shows the distribution of families, represented by dots, according to the number of times closets were cleaned per year and the number of families in each group.

Where the pit closets were found they were never cleaned. The privy was simply moved to a new location when the pit became full. The fact that fifty-one families used lime, two disinfectants, and one ashes helped some in preserving sanitary conditions. On eighteen farms, however, no such sanitary measures were practiced.

The average size of farm visited in Pleasants County was ninety acres, and the average number actually living on the farms at the time of the survey was 4.8 persons.

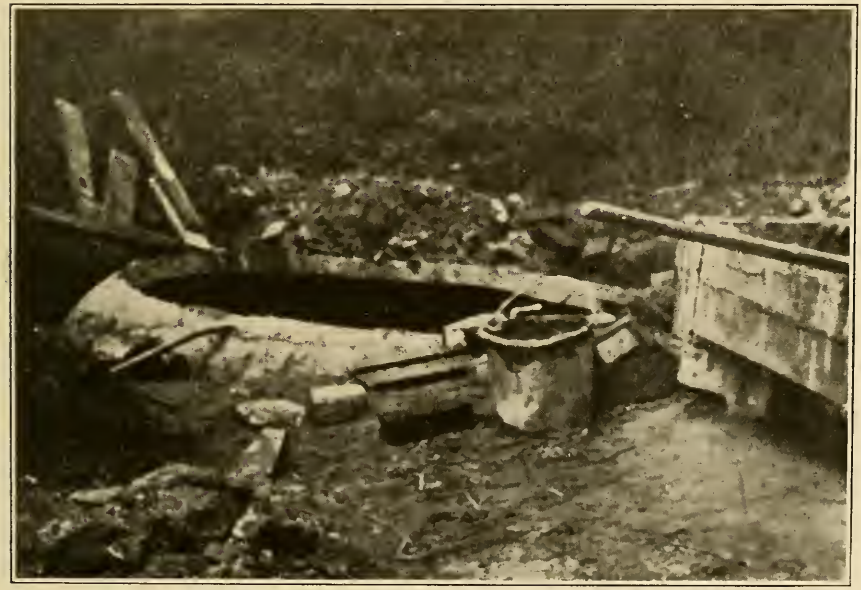
SUMMARY

Water Supply

The principal sanitation problem with reference to farm water supply is the bringing about of conditions at the source which will insure a safe supply at all times. There is vast room for improvement here and the responsibility rests with the individual farmer, and with the community. The farmer's responsibility extends beyond his own home, since the whole question is so closely linked up with public welfare. Saltwell community in Harrison County has pioneered the way in this regard. Every well and spring in this community was tested by a specialist, and such supplies as were found to be dangerous, were improved and protected until the water in the whole community was made safe for use.

The cost of properly protecting wells or springs is comparatively little. In most cases it is not the cost that hinders bringing this about; rather it is procrastination—the putting off until tomorrow. No work is more important, however, and if the farmer can be brought to this realization, conditions will be greatly improved. What is needed apparently, is more information and greater stimulation.

Sixty-six of the 287 farmers visited could have had the convenience and satisfaction of running water in the house by merely piping the water direct. On each of the sixty-six farms, a source of supply, usually a spring, was high enough to deliver water by gravity,



A Circular Brick Reservoir Nearly Completed. Water Was to be Piped Directly from the Reservoir to the House by Gravity.

under sufficient pressure. In spite of this fact, only thirty-three of the 287 families were planning any sort of installation. Those who had running water in the houses declared the labor saving and the convenience to be ample return on the investment. The complete installation costs of each of the systems found ranged between $300 and $400.

TABLE 4.—Source and Methods of Obtaining Water on 287 West Virginia Farms.

How Obtained	Source of Supply				Totals
	Dug Wells	Drilled Wells	Springs	Cisterns	
Complete Water System with Bath	1	1	5	1	8
Water System—No Bath			5		5
Pump in Kitchen		2	1	1	4
Pump on Well or Cistern Outside	49	37		29	115
Windlass on Well Outside	46			1	47
Rope and Bucket	14	34		2	50
Dipped Up			58		58
Totals	110	74	69	34	287

Table 4 shows the sources of water supply on 287 West Virginia farms. It can be seen from the table that dug wells were the most common source of water, and that springs furinshed the supply on a large percentage of the farms visited. Cisterns seemed to be growing in popularity as a source of water supply. The great advantage of cistern water from the standpoint of the housewife was that it was soft and more desirable for washing purposes. Not enough attention was being paid to properly filtering the cistern water that was being used for drinking purposes. Otherwise, the construction of the cisterns was generally good. Figure 10 presents in a graphic way the data given in Table 4.

If to the foregoing data were added the information obtained during the summer of 1923 in several other sections of the state, a more comprehensive view of rural sanitary conditions might be obtained. In all, 215 homes were visited at this time, the great majority of the

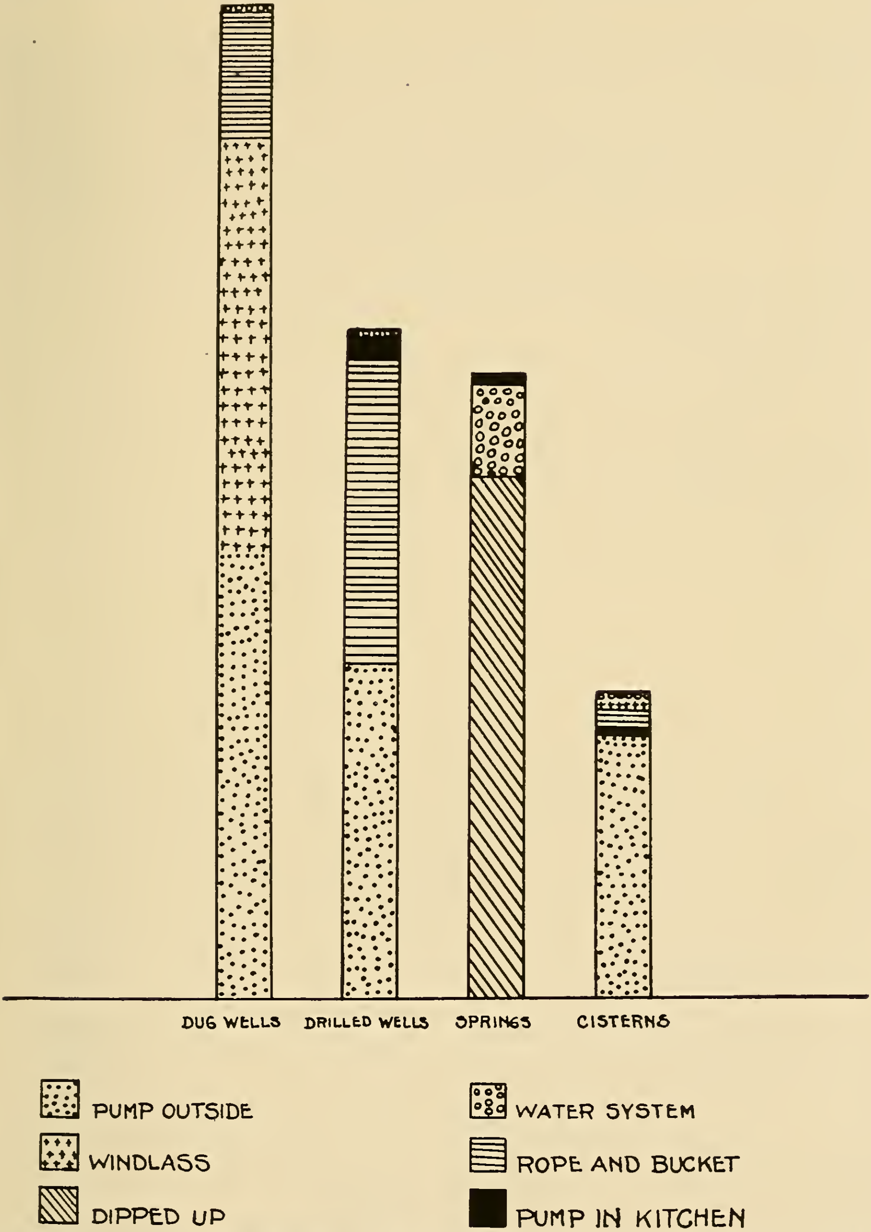


Fig. 10.—Graphic Representation of Sources and Methods of Obtaining Water on 287 West Virginia Farms.

records being taken on farms. A few rural homes other than farm homes, however, were included in this survey.

A summary of the data obtained in both surveys relative to water supply is shown in Table 5. The counties in West Virginia from which this total information was obtained are Marshall, Summers, Pleasants, Braxton, Roane, Harrison, Monongalia, and Lewis.

TABLE 5.—Source and Method of Obtaining Water on 502 West Virginia Farms.

How Obtained	Source of Supply				Totals
	Dug Wells	Drilled Wells	Springs	Cisterns	
Complete Water System with Bath	1	1	28	2	32
Water System—No Bath	1	3	20	1	25
Pump in Kitchen	12	7	2	2	25
Pump on Well or Cistern Outside	74	68		30	172
Windlass on Well Outside	94	15		1	110
Rope and Bucket	24	36		2	62
Dipped Up			76		76
Sweep	2				2
Totals	208	130	126	38	502

Table 5 shows water supply conditions on 502 farms in West Virginia. The predominance of dug wells as a source of supply is even more strikingly shown here. There were nearly as many springs as drilled wells used in supplying water.

The relative importance of the various sources of supply, expressed in percentages was as follows:

Dug Wells	41
Drilled Wells	26
Springs	25
Cisterns	8
Total	100

Sewage Disposal

The opportunity for improvement in methods of disposing of sewage on the farm is great, and the need for such improvement is pressing. It is impossible for health authorities to maintain a corps of workers large enough to give the help needed in isolated rural homes. If proper information could be given the farmers, they

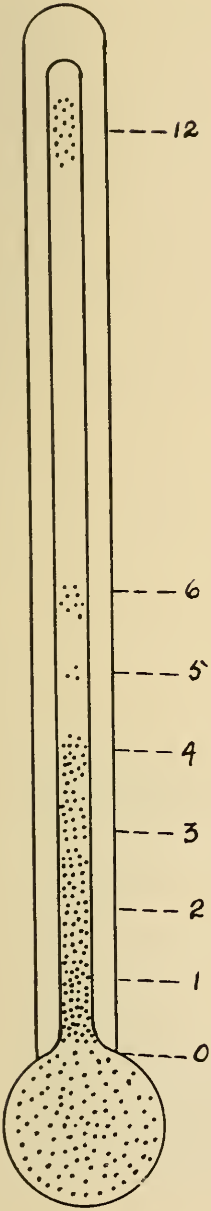


Fig 11.—Number of Times Closets Were Cleaned per Year on 258 West Virginia Farms.

should be able to make these improvements themselves. At present, however, the percentage of outdoor closets on farms that would be passed as sanitary by the Department of Health, is extremely low. Figure 12 summarizes graphically the methods of sewage disposal.

The following resolutions have been adopted by the West Virginia Public Health Council:

"On and after the first day of August, one thousand nine hundred and twenty-five, it shall be the duty of every person, firm or corporation, that maintains or has for use any surface privy, which is hereby defined as an outhouse for convenience of defication, to maintain the same in a sanitary condition at all times."

"Any surface privy shall be PRIMA FACIE considered to be sanitary when the same has been constructed or is being maintained in accordance with the rules and regulations, and specifications and drawings governing such structures as approved by the State Department of Health and set forth in bulletin entitled 'Instructions for Building Sanitary Privies for Rural Homes' issued May, 1923, by the State Department of Health. And said rules, specifications and drawings for maintaining and constructing of privies are hereby declared to be the minimum requirements governing the same as contemplated hereunder."

In the bulletin mentioned above this statement is made: "The insanitary open-back privy is a health menace at any rural home. If you allow it to exist you are inviting into your home sickness and death from typhoid fever, dysentery, and other acute intestinal infections." Yet on 124 of the 287 farms visited, this type of privy was in

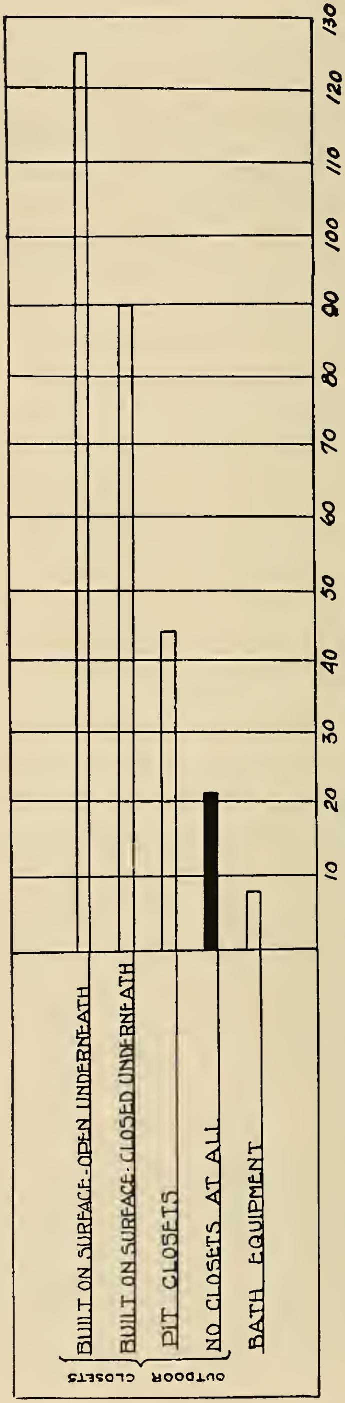


Fig. 12.—Methods of Sewage Disposal on 287 West Virginia Farms.

use. Ninety others were built on the surface but closed at the rear, and on twenty-one farms there were no privies at all. Figure 11 shows the distribution of families, represented by dots, according to the number of times closets were cleaned per year on 258 West Virginia Farms. The State Department of Health recommends either the pit privy or the septic tank privy as sanitary. No septic tank privies were found, and only forty-four of the 287 farmers visited had pit privies, a few of which barely deserved this classification.

Where bath equipment was found, the effluent was either drained out on the surface of a field or into a near-by creek. No septic tanks were found, although the need for them was apparent. These two statements would hold true if to this information were added the data taken on 215 homes in 1923, making a total of 502. Not a septic tank was found during either survey.

CONCLUSIONS

The data presented indicate that West Virginia farmers are not giving sufficient attention to water supply and sewage disposal.

The greatest immediate need relative to water supply is the protection of the source of supply against contamination. The survey shows than many farmers are careless in this regard.

There are many farmers in West Virginia who could pipe water directly to the house from a source of supply at a higher elevation.

Without some concerted effort such improvements will come slowly, as indicated by the few who have even contemplated installing running water.

From information given by those who have running water in the houses, it is certain that the saving of labor, convenience, and satisfaction resulting are ample returns on the investment.

All water systems found had been installed at costs ranging from $300 to $400. This indicated about what similar installations would cost.

Conditions as revealed relative to sewage disposal show the need of an adequate and safe method of disposing of the wastes from the home.

More Privies as Well Constructed and Maintained as This are Needed on West Virginia Farms.

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